

Description

[SCANNING METHOD]

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the priority benefit of Taiwan application serial no. 91121209, filed September 17, 2002.

BACKGROUND OF INVENTION

[0002] Field of the Invention

[0003] The invention relates in general to a scanning method, and more particularly, to a method of extracting the position of a transmission document.

[0004] Related Art of the Invention

[0005] In recent years, the improvement in processing speed and data storage for processors and computer related products has greatly enhanced the graphics process. Consequently, image processing equipment such as optical scanners are being improved to comply with the requirement for high resolution and high-speed scan.

[0006] Currently, the flatbed scanner is one of the most com-

monly seen scanners in the market. The flatbed scanner has a document plane such as a glass flatbed for disposing a document or a picture. An optical scan module moving along such document plane is then used to scan the document or picture, so that the image of the document or picture can be extracted. The structure of the flatbed scanner is simple and highly expandable. Therefore, in addition to scanning the typical reflective document or picture, the flatbed applicable to scanning a transparent document or film is broadly used.

[0007] The conventional flatbed scanner with transparent scanning function is normally equipped with an external transparency adapter and an external film holder. Referring to Figure 1, a conventional flatbed scanner with the transparent scanning function is shown. The scanner 100 includes an optical scan module 104, an original document plane 130, an external transparency adapter 120, and an external transparent film holder 110. A transparent document 102 is placed on the original document plane 130, the transparent film holder 110 is located over the original document plane 130, and the transparency adapter 120 over the original document plane 130 covers the scanning region of the transparent document 102. The

optical scan module 104 scans the transparent document 102 along the original document plane 130.

[0008] Referring to Figure 1 and Figure 2 that illustrate the allocation of a transparency adapter for a conventional transparent scan and the transparent film holder, the transparent film holder 110 has a scan window 112, a calibration window 114, and four markers 116. While scanning the transparent document 102, the transparent film holder 110 is disposed on the original document plane 130 of the scanner 100. The transparent document 102 is then placed within the scan window 112. The external transparency adapter 120 is located over the markers 116 to cover both the scan window 112 and the calibration window 114.

[0009] In addition, the external transparency adapter 120 projects a plane light source onto the scan window 112 and the calibration window 114. The optical scan module then extracts the light beams transmitting through the scan window 112 and the calibration window 114, so as to discriminate the image of the transparent document 102. The calibration window 114 is used to read the signal of the light source in advance, such that the coverage of the scan window can be properly read.

[0010] The conventional transparent film holder provides the scanner the functions of scanning and positioning the transparent document. Once the transparent film holder is missing, the functions of correcting and reading the scan region are lost. The user cannot perform the scanning process for a transparent document anymore.

[0011] In addition, the scan window limits the size of the transparent document, and the transparent document has to be disposed within the scan window. This is very inconvenient for the users. Further, the correcting window occupies significant scan area. Therefore, the scanning range cannot be optimized.

[0012] Further, the external transparency adapter has to be aligned over the markers of the transparent film holder. Therefore, one cannot arbitrarily change the angle. The external transparency adapter is also an optional device that costs additional expense of the user.

SUMMARY OF INVENTION

[0013] The present invention provides a scanning method that uses a plane light source with coverage of a transparent document. The distribution range of the plane light source is confirmed by preview scanning. The transparent scan is then performed only on the coverage of the plane light

source.

[0014] The present invention provides a scanning method suitable for use in a flatbed scanner with transparent scanning function. The flatbed scanner has an optical scan module and an original document plane for locating a transparent document. The optical scan module moves along the original document plane. The scanning method comprises the following steps. The transparent document is disposed on the original document plane. A plane light source with coverage including the region to be scanned of the transparent document is provided. The optical scan module is used to scan the original document plane once to read the distribution coverage of the plane light source. The optical scan module then scans the region within the coverage of the plane light source to extract the image of the transparent document.

[0015] The present invention further provides a method for capturing the scan position applicable for a flatbed scanner with transparent scanning function. The flatbed scanner has an optical scan module and an original document plane for placing a transparent document. The optical scan module moves along the original document plane. The method comprises the following steps. A plane light

source with coverage including the scanning region of the transparent document is provided. The original document plane is scanned once using the optical scan module to read the distribution range of the plane light source, such that the scanning position is captured.

[0016] In one embodiment of the present invention, an external transparency adapter or a built-in transparency adapter is provided. The external or built-in transparency adapter is placed over the original document plane. In addition, the transparent document can be disposed with an arbitrary angle at an arbitrary position over the original document plane.

BRIEF DESCRIPTION OF DRAWINGS

[0017] These, as well as other features of the present invention, will become more apparent upon reference to the following drawings.

[0018] Figure 1 shows a conventional scanner with the transparent scanning function.

[0019] Figure 2 shows the allocation of a transparency adapter and a transparent film holder for the conventional transparent scanning process.

[0020] Figure 3 shows the allocation of a scanner with transparent scanning function according to the present invention.

- [0021] Figure 4 shows the allocation of a transparent document and a transparency adapter according to the present invention.
- [0022] Figure 5 shows a schematic drawing of a scanning method according to the present invention.

DETAILED DESCRIPTION

- [0023] Referring to Figure 3, a preferred embodiment of a scanner with transparent scanning function is illustrated. The transparent document 102 is placed on the original document plane 130. The optical scan module 104 moves along the original document plane 130 for scanning the transparent document 102. A plane light source 122 is placed over the original document plane 130 to radiate thereon. The distribution area of the plane light source 122 is larger than the scanning region of the transparent document 102. The plane light source 122 includes, for example, an external or a built-in transparency adapter 120 disposed over the original document plane 130.
- [0024] The plane light source 122 used in this embodiment is not limited to the external light source. Instead, the plane light source 122 can be mounted to a top lid of the scanner in a built-in manner to perform transparent scanning. The built-in transparency adapter generally provides a

larger distribution range of the light source. For example, the distribution range is as large as the area of the scan window. Therefore, the scanning range of the scanner is greatly enlarged.

[0025] The transparency adapter typically includes a light source, a light guiding board and a shell. While projecting on the light guiding board, the light beam emitted from the light source is guided into a plane light source distributed all over the light guiding board. The shell encloses the light guiding board, allowing the light to be converged on the original document plane as the plane light source.

[0026] As shown in Figure 3, the difference from the prior art is that the external transparent film holder is not required. The distribution range of the plane light source 122 is confirmed by preview scanning. By extracting the transmitting light beam extracted by the optical scan module 104, the image of the transparent document 102 can be discriminated.

[0027] Referring to Figure 4, an embodiment of a transparent document and transparency adapter is illustrated. The transparent document 102 can be disposed on any position on the original document plane 130 with any angle. The angle of the distribution range of the plane light

source 122 can also be changed without being restricted only to the region of the transparent document 102 to be scanned .

[0028] Referring to Figure 5, a process flow for a scanning method in one embodiment of the present invention is shown. The scanning method includes steps S200 which provides a transparent document, S202 which provides a plane light source, S204 which performs preview scanning, and S206 for image extraction.

[0029] In step S200, the transparent document 102 is placed on the original document plane 130 of the scanner 100, wherein the transparent document 102 can be, for example, a transparency, and a pattern or a document in positive or negative mechanism.

[0030] In step S202, the plane light source 122 with coverage including the region to be scanned of the transparent document 102 is provided, wherein the plane light source 122 can be, for example, a built-in or an external transparency adapter.

[0031] In step S204, the optical scan module 104 is used to scan the original document plane 130 once, so that the distribution range of the plane light source 122 is obtained. Also and, the optical scan module 104 can calibrate the

brightness for the plane light source 122 via the calibration window 114. The calibration window 114 is, for example, disposed over the transparency adapter 120 and located within the distribution range of the plane light source 122. As a result, when the light emitted from the optical scan module 104 goes through the calibration window 114, and the brightness of the plane light source 122 can be calibrated.

[0032] In step S206, the optical scan module 104 is used to scan only the region covered by the plane light source 122 to extract the image of the transparent document 102.

[0033] Accordingly, the present invention provides a scanning method having at least the following advantages.

[0034] 1. The scanning method of the invention does not require a transparent film holder to perform scanning on the transparent document and is more convenient.

[0035] 2. In the scanning method of the invention, the transparent document can be placed at any position on the original document plane at any angle without positioning.

[0036] 3. In the scanning method of the invention, the plane light source can be provided by either an external or a built-in transparency adapter.

[0037] 4. In the scanning method of the invention, the orienta-

tion of the plane light source can be changed without using the positioning markers, so that it is more convenient to use.

[0038] Other embodiments of the invention will appear to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples to be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.